SEQUENCE LISTING

SEQ ID NO: 1 (Haemophilus aegyptius)

```
MKRNLLKQSVIAVLIGGTTVSNYALAQAQAQAQVKKDELSELKKQVKEMDAAIDGILDDNIAYEAEVDAKLDQHSAALGRHTNRLNNL
KTIAEKAKGDSSEALDKIEALEEQNDEFLADITALEEGVDGLDDDIAGIQDNISDIEDDINQNSADIATNTAAIATHTQRLDNLDNRV
NNLNKDLKRGLAAQAALNGLFQPYNVGKLNLTAAVGGYKSQTAVAVG
```

SEQ ID NO: 2 (Escherichia coli)

```
MKTVNVALLALIISATSSPVVLAGDTIEAAATELSAINSGMSQSEIEQKITRFLERTDNSPAAYTYLTEHHYIPSETPDTTQTPTVQT
DPDAGQKTVAATGDVQTTARYQSMINARQSAVTDAQQTQITEQQAQIVATQKTLAATGDTQNTAHYQEMINARLAAQNEANQRTATEQ
GQKMNALTTDVAVQQQNERTQYDKQMQSLAQESAQAHEQIDSLSQDVTQTHQQLTNTQKRVADNSQQINTLNNHFSSLKNEVDDNRKE
ANAGTASAIAIASQPQVKTGDVMMVSAGAGTFNGESAVSVGTSFNAGTHTVLKAGISADTQSDFGAGVGVGYSF
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SEQ ID NO: 3 (EHEC)

```
MNKIFKVIWNPATGNYTVTSETAKSRGKKSGRSKLLISALVAGGMLSSFGALANAGNDNGQGVDYGSGSAGDGWVAIGKGAKANTFMNTSGSSTAVG
YDAIAEGQYSSAIGSKTHAIGGASMAFGVSAISEGDRSIALGASSYSLGQYSMALGRYSKALGKLSIAMGDSSKAEGANAIALGNATKATEIMSIAL
GDTANASKAYSMALGASSVASEENAIAIGAETEAAENATAIGNNAKAKGTNSMAMGFGSLADKVNTIALGNGSQALADNAIAIGQGNKADGVDAIAL
GNGSQSRGLNTIALGTASNATGDKSLALGSNSSANGINSVALGADSIADLDNTVSVGNSSLKRKIVNVKNGAIKSDSYDAINGSQLYAISDSVAKRL
GGGAAVDVDDGTVTAPTYNLKNGSKNNVGAALAVLDENTLQWDQTKGKYSAAHGTSSPTASVITDVADGTISASSKDAVNGSQLKATNDDVEANTAN
IATNTSNIATNTANIATNTTNITNLTDSVGDLQADALLWNETKKAFSAAHGQDTTSKITNVKDADLTADSTDAVNGSQLKTTNDAVATNTTNIANNT
SNIATNTTNISNLTETVTNLGEDALKWDKDNGVFTAAHGTETTSKITNVKDGDLTTGSTDAVNGSQLKTTNDAVATNTTNIATNTTNISNLTETVTN
LGEDALKWDKDNGVFTAAHGNNTASKITNILDGTVTATSSDAINGSQLYDLSSNIATYFGGNASVNTDGVFTGPTYKIGETNYYNVGDALAAINSSF
STSLGDALLWDATAGKFSAKHGTNGDASVITDVADGEISDSSSDAVNGSQLHGVSSYVVDALGGGAEVNADGTITAPTYTIANADYDNVGDALNAID
TTLDDALLWDADAGENGAFSAAHGKDKTASVITNVANGAISAASSDAINGSQLYTTNKYIADALGGDAEVNADGTITAPTYTIANAEYNNVGDALDA
LDDNALLWDETANGGAGAYNASHDGKASIITNVANGSISEDSTDAVNGSQLNATNMMIEQNTQIINQLAGNTDATYIQENGAGINYVRTNDDGLAFN
DASAQGVGATAIGYNSVAKGDSSVAIGQGSYSDVDTGIALGSSSVSSRVIAKGSRDTSITENGVVIGYDTTDGELLGALSIGDDGKYRQIINVADGS
EAHDAVTVRQLQNAIGAVATTPTKYFHANSTEEDSLAVGTDSLAMGAKTIVNGDKGIGIGYGAYVDANALNGIAIGSNAQVIHVNSIAIGNGSTTTR
GAQTNYTAYNMDAPQNSVGEFSVGSADGQRQITNVAAGSADTDAVNVGQLKVTDAQVSQNTQSITNLDNRVTNLDSRVTNIENGIGDIVTTGSTKYF
KTNTDGVDASAQGKDSVAIGSGSIAAADNSVALGTGSVATEENTISVGSSTNQRRITNVAAGKNATDAVNVAQLKSSEAGGVRYDTKADGSIDYSNI
TLGGGNGGTTRISNVSAGVNNNDVVNYAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVA
LGVSMVSANGRWVYKLQGSTNSQGEYSAALGAGIQW
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5 SEQ ID NO: 4 (Actinobacillus actinomycetemcomitans)

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MTYQLFKHHLVALMVTGAISVNALAKDSFLENPSANLPQQVFKNRVDIFNNETNINENKKDIAINKANIASIEKDVMRNTGGIDRLAK
QELVNRARITKNELDIRKNTKSIAENTASIARIDGNLEGVNRVLQNVDVRSTENAARSRANEQKIAENKKAIENKADKADVEKNRADI
AANSRAIATFRSSSQNIAALTTKVDRNTARIDRLDSRVNELDKEVKNGLASQAALSGLFQPYNVGSLNLSAAVGGYKSKTALAVGSGY
RFNQNVAAKAGVAVSTNGGSATYNVGLNFEW
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SEQ ID NO: 5 (Haemophilus somnus)

```
MKKVQFFKYSSLALALGLGVSASALAAPTSTSTTTGPEAPPTGPAPTAKDPLAETALAYDLENEVAYLRMKAGEWMQLGLDPEKEVIK
GWNEVKSLPRIDGNGKDKQTKDQIAMLIRTVDNTKELGRIVSTNIEDIKNLKKELYGFVEDVNESEARNISRIDENEKDIKNLKKELY
DFVEDVNESEARNISRIDENEKDINTLKELMDEDLNSVLTQIEDVKLTFQDVNDNVNLAFEEINGNAQKFDTAIEGLTSGLSDLQAKV
DANKQETEDDIADNAKAIHSNTKGIAKNTKDIRDLDTKTKQMLENDKNLMTGLESLATETSKGFERFDVKTQQLDQAVANVVGRVDIT
EQAIRQNTAGLVNVNKRVDTLDKNTKAGIASAVALGMLPQSTAPGKSLVSLGVGHHRGQSATAIGVSSMSSNGKWVVKGGMSYDTQRH
ATFGGSVGFFFN
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SEQ ID NO: 6 (Haemophilus ducreyi)

```
MKIKCLVAVVGLACSTITTMAQQPPKFAGVSSLYSYEYDYGKGKWTWSNEGGFDIKVPGIKMKPKEWISKQATYLELQHYMPYTPVLV
TSAPDVSPSSISILLYPMSDPDQLGINRQQLKLNLYSYFNDLRHDFKLKVLDARISKNKQNIDTISKYLLELGTYLDGSYRMMEQNTH
NINKNTHNINKNTHNINKLSKELQTGLANQSALSMLVQPNGVGKTSVSAAVGGYRDKTALAIGVGSRITDRFTAKAGVAFNTYNGGMS
YGASVGYEF
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SEQ ID NO: 7 (EPEC)

```
MKTVNVALLALIISATSSPFVLAGDTIEAAATELSAINSGMSQSEIEQKITRFLERTDNSPAAYTYLTEHHYIPSETPDTTQTPPVQT
DPDAGQKTVAATGDVQTTARYQSMINARQSTVTDAQQTQITEQQAQIVATQKTLAATGDTQNTAHYQEMINARLAAQNEANQRTTTEQ
GQKMNALTTDVAAQQQKERAQYDKQMQSLAQKSVQAHEQIESLRQDSAQTQQQLTNTQKRVADNSQQINTLNNHFSSLKNEVEDNRKE
ANAGTASAIAIASQPQVKTGDLMMVSAGAGTFNGESAVSVGTSFNAGTHTVLKAGISADTQSDFGAGVGVGYSF
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SEQ ID NO: 8 (EAEC)

```
MKTVKLSLLAVVVATAVSPSAFAGDTVEAATTELTVIQPGMSQSEIDQKIGRFLERTGNSVAAQNYLIAHDYQTTTPQENTAASPVQP
TNTLNPITNQAQTDRDNGQDTAIQDAQHAANWASLKADDAQHAITVAQTDIDANTAAITDTRNDVSAVQSDVTNIKGDVAHAQSTADH
ANANANTALINGVKLSGAVTENKNNIEQNRSDIADQQKLLASNEQKQIVRDNGQDTAIQDAQHAANWASLKADDAQHAITVAQTDIDA
NKAAITDIRNDVSAVQSDVTNIKGDVAHAQSTADHANANANTALMNGVKLSSAVTENKNNIEQNRSDIADQQKLLASNEQKQIVRDNG
QDTAIQDAQHAANWASMKADDAQHAITVAQTDIDANKAAIADTRNDVSAVQSDVTNIKGDVAHAQSTADHANANANTALINGVKLSGA
VTENKNNIEQNRSDIADQQQQLDETRKIVAATGDVQTAARYQSMIDARQTAAANAQQAQADTQQQQMDDQQKQIDATQKTVSALGDAQ
TNAHYQEMVNAGLRAQNDANARTAAEQKQKIDTLATNQATQQHINSVQYGEQIQRLAQDSTQTHEQIDSLTQDVTQTHQQLSNTQKRV
ADNSQQITTLNNHFSSLKNEVEDNRKEANAGTASAIAIASQPQVKAGDFMMMSAGAGTFNGESAVSVGTSFNAGTHTVIKAGVSADTQ
SDFGAGVGVGYSF
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SEQ ID NO: 9 (EAEC)

```
MNKIFKVIWNPATGSYTVASETAKSRGKKSGRSKLLISALVAGGMLSSFGVQAQAGRDNGQGVNYGQGTGTGWVAIGEDAKANSFTDT
GGGSSTAVGYHSTADGRWSTALGAKTHSLGEASVALGINTTSAGERSLAIGASATSTGGFSIALGRYANSVGEFSIAQGDHAETGADD
AIAFGRESKALGIMSIALGATANASKEYAMALGASSAASAANAIAVGRNSAAAGVDSLAFGRQSAASAANAIAMGAESKAAENATAVG
TNAEANGLNSIALGSGSIADVDNTIALGNQSQAVAAGAIAIGQGNKADGANAIALGNGSITGGVNAIALGQGSYAGLENGTAIGAQAS
AQGKNSVALGAGSVATDADTVSVGNTTAQRQIVNMAAGDISTTSTDAINGSQLYAISKSVADNLGGGATVNAQGVVTSPNYRLKSGIF
GTVGDALTGLDNNTLQWDSLKKAYSAAHGTDTTSTITNVKDGAISDTSKDAVNGSQLKTTNDNVATNTANITTNTNSINTLTDSVGDL
KDDALLWNGTAFSAAHGTEATSKITNVKDGDLTAGSTDAVNGSQLKTTNDNVATNTTNITNLTDSVGDLKDDALLWNGTAFSAAHGTD
ATSKITNVKDGDLTAGSTDAVNGSQLKTTNDAVAANTTNIATNTTNITNLTDAVDSLGDDSLLWNATAGAFSAAHGTDATSKITNVTA
GDLTAGSTDAVNGSQLKTTNDAVAANTTNIATNTTNITNLTDAVDSLGDDSLLWNATAGAFSAAHGTDATSKITNVKDGDLTAGSTDA
VNGSQLKTTNDAVAANTTNIATNTTNITNLTDAVDSLGDDSLLWNATAGAFSAKHGTNGTDSKITNLLAGTVSSDSTDAINGSQLYGL
ADSFTSYLGGGADISDAGVLTGPTYTIGGTDYNNVGDALAAINTSFSTSLGDALLWDATAKGGDGAFSAGRGTDNTASIITNVADGAI
SSTSSDAINGSQLYDTSKYIADTLGGDAEVNADGTITAPTYAIAGGSYSNVGDALEAIDTTLDDALLWDATANDGNGAFSAAHGKDKT
ASVITNVANGAISATSSDAINGSQLYTTNKYIADALGGDAEVNADGSITAPTYTIANAEYNNVGDALDALDDNALLWDATANDGAGAY
NASHDGKASIITNVADGNIGEGSTDAINGSQLFNTNMLIQQNSEIINQLAGNTSETYIEDNGAGINYVRTNDNGLAFNDASASGIGAT
AVGYNAVASGESSVAIGQGSSSNVDTGIALGSSSVSSRVIVKGSRDTSVSEEGVVIGYDTTDGELLGALSIGDDGKYRQIINVADGSE
AHDAVTVRQLQNAIGAVATTPTKYFHANSTEEDSLAVGEDSLAMGAKTIVNGNAGIGIGYGAYVDANALNGIAIGSNARANHANSIAM
GNGSQTTRGAQTGYAAYNMDAPQNSVGEFSVGSEDGQRQITNVAAGSADTDAVNVGQLKVTDAQVSQNTQSITNLNNQVTNLDTRVTN
IENGIGDIVTTGSTKYFKTNTDGVDANAQGKDSVAIGSGSIAAADNSVALGTGSVANEENTISVGSSTNQRRITNVAAGVNATDAVNV
SQLKSSEAGGVRYDTKADGSVDYSNITLGGGNGGTTRISNVSAGVNNNDAVNYAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGG
IASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVYKLQGSTNSQGEYSAALGAGIQW
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SEQ ID NO: 10 (UPEC)

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MNKIFKVIWNPATGSYTVASETAKSRGKKSGRSKLLISALVAGGLLSSFGASADNYTGQPTDYGDGSAGDGWVAIGKGAKANTFMNTS
GASTALGYDAIAEGEYSSAIGSKTLATGGASMAFGVSAKAMGDRSVALGASSVANGDRSMAFGRYAKTNGFTSLAIGDSSLADGEKTI
ALGNTAKAYEIMSIALGDNANASKEYAMALGASSKAGGADSLAFGRKSTANSTGSLAIGADSSSSNDNAIAIGNKTQALGVNSMALGN
ASQASGESSIALGNTSEASEQNAIALGQGSIASKVNSIALGSNSLSSGENAIALGEGSAAGGSNSLAFGSQSRANGNDSVAIGVGAAA
ATDNSVAIGAGSTTDASNTVSVGNSATKRKIVNMAAGAISNTSTDAINGSQLYTISDSVAKRLGGGATVGSDGTVTAVSYALRSGTYN
NVGDALSGIDNNTLQWNKTAGAFSANHGANATNKITNVAKGTVSATSTDVVNGSQLYDLQQDALLWNGTAFSAAHGTEATSKITNVTA
GNLTAGSTDAVNGSQLKTTNDNVTTNTTNIATNTTNITNLTDAVNGLGDDSLLWNKAAGAFSAAHGTEATSKITNVTAGNLTAGSTDA
VNGSQLKTTNDNVTTNTTNIATNTTNITNLTDAVNGLGDDSLLWNKTAGAFSAAHGTDATSKITNVTAGNLTAGSTDAVNGSQLKTTN
DNVTTNTTNIATNTTNITNLTDAVNGLGDDSLLWNKTAGAFSAAHGTDATSKITNVKAGDLTAGSTDAVNGSQLKTTNDNVSTNTTNI
TNLTDAVNGLGDDSLLWNKTAGAFSAAHGTDATSKITNVKAGDLTAGSTDAVNGSQLKTTNDNVSTNTTNITNLTDSVGDLKDDSLLW
NKAAGAFSAAHGTEATSKITNLLAGKISSNSTDAINGSQLYGVADSFTSYLGGGADISDTGVLSGPTYTIGGTDYTNVGDALAAINTS
FSTSLGDALLWDATAGKFSAKHGINNAPSVITDVANGAVSSTSSDAINGSQLYGVSDYIADALGGNAVVNTDGSITTPTYAIAGGSYN
NVGDALEAIDTTLDDALLWDTTANGGNGAFSAAHGKDKTASVITNVANGAVSATSNDAINGSQLYSTNKYIADALGGDAEVNADGTIT
APTYTIANTDYNNVGEALDALDNNALLWDEDAGAYNASHDGNASKITNVAAGDLSTTSTDAVNGSQLNATNILVTQNSQMINQLAGNT
SETYIEENGAGINYVRTNDSGLAFNDASASGIGATAVGYNAVASHASSVAIGQDSISEVDTGIALGSSSVSSRVIVKGTRNTSVSEEG
VVIGYDTTDGELLGALSIGDDGKYRQIINVADGSEAHDAVTVRQLQNAIGAVATTPTKYYHANSTAEDSLAVGEDSLAMGAKTIVNGN
AGIGIGLNTLVLADAINGIAIGSNARANHADSIAMGNGSQTTRGAQTNYTAYNMDAPQNSVGEFSVGSEDGQRQITNVAAGSADTDAV
NVGQLKVTDAQVSQNTQSITNLNTQVTNLDTRVTNIENGIGDIVTTGSTKYFKTNTDGADANAQGKDSVAIGSGSIAAADNSVALGTG
SVADEENTISVGSSTNQRRITNVAAGVNATDAVNVSQLKSSEAGGVRYDTKADGSIDYSNITLGGGNSGTTRISNVSAGVNNNDAVNY
AQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVYKLQG
STNSQGEYSAALGAGIQW
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SEQ ID NO: 11 (Shigella flexneri)

MTNLGEDALKWDKDNGVFTAAHGTETTSKITNVKDGDLTTGSTDAVNGSQLKTTNDAVATNTTNIATNTTNISNLTETVTNLGEDALK
WDKDNGVFTAAHGNNTASKITNILDGTVTATSSDAINGSQLYDLSSNIATYFGGNASVNTDGVFTGPTYKIGETNYYNVGDALAAINS
SFSTSLGDALLWDATAGKFSAKHGTNGDASVITDVADGEISDSSSDAVNGSQLHGVSSYVVDALGGGAEVNADGTITAPTYTIANADY
DNVGDALNAIDTTPDDALLWDADAGENGAFSAAHGKDKTASVITNVANGAISAASSDAINGSQLYTTNKYIADALGGDAEVNADGTIT
APTYTIANAEYNNVGDALDALDDNALLWDKTANGGAGAYNASHDGKASIITNVANGSISEDSTDAVNGSQLNATNMMIEQNTQIINQL
AGNTDATYIEENGAGINYVRTNDNDLAFNDASASGVGATAVGYNAVASGASSVAIGQNSSSTVDTGIALGSSSVSSRVIAKGSRDTSV
TENGVVIGYDTTDGELLGALSIGDDGKYRQIINVADGSEAHDAVTVRQLQNAIGAVATTPTKYFHANSTAEDSLAVGEDSLAMGAKTV
VNGNAGIGIGLNTLVLADAINGIAIGSNARANHANSIAMGNGSQTTRGAQTGYTAYNMDAPQNSVGEFSVGSEDGQRQITNVAAGSAD
TDAVNVGQLKVTDERVAQNTQSITNLNNQVTNLDTRVTNIENGIGDIVTTGSTKYFKTNTDGVDANAQGKDSVAIGSGSIAAADNSVA
LGTGSVAEEENTISVGSSTNQRRITNVAASVNATDAVNVSQLKSSEAGGVRYDTKADGSIDYSNITLGGGNGSTTRISNVSAGVNNND
AVNYAQLKQSAQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVY
KLQGSTNSQGEYSAALGAGIQW

SEQ ID NO: 12 (Brucella melitensis)

MSFFKKNISITAMGGLMLSLAVDAAKAEENVSQVKLPPVFVFELVENQGLANIALIRPRVIAPDNNLRPGGIVSGIAGLLTLGQENRN
LISENRQVINNNTTAIGQNRTSISTNAKGVADNRAAIRQNSAAISALGQRVDGLQGQINSARKEARAGAANAAALSGLRYDNRPGKVS
IATGVGGFKGSTALAAGIGYTSKNENARYNVSVAYNEAGTSWNAGASFTLN

SEQ ID NO: 13 (Brucella suis)

MSFFKKNISITAMGGLMLSLAVDAAKAEENVSQVKLPPVFVFELVENQGLANIALIRPRVIAPDNNLRPGGIVSGIAGLLTLGQENRN
LISENRQVINNNTTAIGQNSDRIDANAKGVADNRAAIGQNSGRIDANAKGVADNKAAIGRNSGRIDANAKGVADNKTAIGRNSGRIDT
NAKGVADNRAAISQNRGRINANAAGVASNRAAIRQNSAAISALGQRVDGLQGQINSARKEARAGAANAAALSGLRYDNRPGKVSIATG
VGGFKGSTALAAGIGYTSKNENARYNVSVAYNEAGTSWNAGASFTLN

SEQ ID NO: 14 (Ralstonia solanacearum)

MVFSAMPQYACAEMLLQNDPGTNCGSVGDAYAWARGDGYSGCKVGYEAAKNLAKGTAFGNSLGQLSPGTNILVYGSTLRAGMNDEVTP
LDSMNIGGHLDVWGASGFHGGVDMNNSAIKNLADGTLSATSTEAVTGRQLNATNTNITNLQNSIKSISSSASLVQQSAAGKDITVAKD
LDGDAVDFSGKKLSDSTTFSRKLTGVAEGTLSATSTDAVSGKQLYTTNQNLSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTIKN
ISGGSAGLVQQSAAGKDITVAKDLDGEAVDFSGKKLSDSTTFSRKLTGVAEGTLSATSTDAVSGKQLYTTNQNLASTNKDLANTNTRL
TTAEGNLSSNTTSITNLQNTIKNISGGSAGLVQQSAAGKDITVAKDLDGDAVDFSGKKLSDSTTFSRKLTGVAEGTLSATSTDAVSGR
QLYTTNQNLSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTVNNISSGSAGLVQQSAAGKDITVAKDLDGDAVDFSGKKLSDSTTF
SRKLTGVAEGTLSATSTDAVSGKQLYTTNQNLSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTVNNISSGSAGLVQQSAAGKDIT
VAKNLDGDAVDFSGKKLSDSTTFSRKLTGVAEGTLSATSTDAVSGKQLYTTNQNLASTNKDLANTNTRLTTAEGNLSSNTTSITNLQN
TIKNISGGSAGLVQQSAAGKDITVAKDLDGDAVDFSGKNLSDSTTFSRKLTGVAEGTLSATSTDAVSGKQLYTTNQNLSTTNQNLADT
NKSLAKTNNNVSATTTNITNLQNTVNNISSGSAGLVQQSAAGKDITVAKDLDGDAVDFSGKKLSDSTTFSRKLTGVAEGTLSATSTDA
VSGKQLYATNQNVSKLSANVTDVSDSVTNIKNTMNTIVNGGGLKYFHANSTLDDAQAMGLESIAFGGAAVAAGMNSMAMGGNARAVAG
NAVALGAGSVADRANTVSVGSAGKERQITNVAAGTADTDAVNVAQLKAAGIINGSGRTNATVTYGTNADGSADYGNVTLGGGNAPAGT
AIHNVAAGTAETDAVNVRQMNAAIASVQKVSNTNDPMFAADGDRAVKRASAKGTHATAMGAAASAGGDQSVATGHNAQSGGDSSVAMG
ANAKATANHAVAVGSGSVANRANTMSVGSAGSERQITNVAAGVQGTDAVNVSQLSQAVYAAVGDLPAGTTARQYTDEQIGMVRQGISQ
VARGAYSGIAAATALTMIPDVDQGKSIAIGIGSATYKGYQAVALGASARISHNLKAKMGVGYSSEGTTVGMGASYQW

5 ### SEQ ID NO: 15 (Sinorhizobium meliloti)

MALGRQSVSAGSGSLAFGNGSYANSNGSVAIGQSAYAANVRAIAIGGDDAFAWREAEQTKAGGSQSIAMGVRARTKSLVVDDPDTVAN
EADPGGASDAIAIGTDAQANGDRSLAIGRQNQAGNEQSIGIGAGNTATGKLSIGIGSSNVASGEQSLSLGAGNNALGQGSISIGTETT
AGGLRSIAFGVRASTKEANLDIPDDVAAIDAIAIGTNTKANGDRSVSIGTGSQASSGAVSIGDAAKAVGDKSVSIGTESWADGDESVS
IGLVNNAGFEGNDRIKGGQTSVSLGAFNQSPGIEAIAIGARNEANADRSIAIGSRAKTKAADPAQADGGARDAVAIGTDALANDDRSI
SIGWNSSTSLNDSISIGTRATSGSAGDIMIGTGSGTGSTSGQNNVALGVAASQKVKGSSNIAIGDSAGGSREGDNNVAIGTNAGIQFS
ESEHETAVRADLVVSDAVSIGNEALASADEAIAIGTGAVASGLKSISIGVGNTVSGASSGAIGDPTDITGTGSYSLGNDNTIAADNAG
TFGNDNTLADAADGSRVIGNGNNIDVSDAFVLGNGADVTEVGGVALGSGSVSDTGADVAGYVPGGASTADQNAIEATQSTRGAVAVGN
PDAETGVYRQITGVAAGTADSDAANVAQLKSVETIAKTGWKLTTDSGSIDGIGPGDELVLKGGDGNIVISNQILSNDVSIDLADEIEV
NRVTARDPDTGASTVLDENGLSFTTQDANGEDTALGPRVTAAGIQAAGKITNVAAGEADTDAVNFSQLRQVETASGNTDQRAVKYDWT
DANTNGVIDEGELNLDSVTLAGGMGGTRISNLAPGALSAASTDAVNGSQLFGLRSRVSNVAVALGGGAAYDPVKDEWIAPKYTIGGTD
YSNVGDALAAVGGTAGAGWSLSAQGANASNVAPGETVDLRSGDGNIVVSKAETGDTVSFDLADDLDVSESITVGADPADPNAPTTVIT
GGSIVIGSTMLGSNGLVITGGPSVTTDGIDAGGMKVTNVANGTVAKDSKDAVNGGQLFDVVANATANGVGYDDKSKGTLTLEGANGTK
ITNVAAGDLNANSTDAVNGSQLYATNVKVDRLDTEVKEIDSRVTYIESFQGDLENAAVYDTDAAGKRLNTLTLEGGDPDKPVLIANVA
KGVKATDAVNVGQLDESVAESKSYTDEKTEWAIDQAAIYTDQVIETKVSAVNNYAQQRFAQLSGEIGQVRSEARQAAAIGLAAASLRF
DNEPGKLSVALGGGFWRSEGALAFGAGYTSEDGRVRANLTGAAAGGNVGVGAGLSITLN

SEQ ID NO: 16 *(Bradorhizobium japonicum)*

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MRAFGSGNAINGTNYAAVGSNNVVAGNNGAVVGSGNGVTGDNTAAFGSSIGIAGGNNAAVGSFSTVTGSNSAAVGSFNNVSGNNSGAF
GTGQNIRGNGTFAIGDPNIVNGNNSLVFGDNNTVNGSNVAGRGDNIQLVGSNNTIAATSSAAGSSVFGSGNTVNATNAVVMGNNSTVS
GASSVAIGNGTAVTGINAIAMGTGAGANFDNSVAIGSGATTTRANQVAVGTASSTYTMSGITSAASKAAQSGPTQLVTSDAAGNLATT
SLAGLGLASAGDINGINSQLAALNGRVDNLTRESRGGVALALAASSLQFDPRPGKISVSGGFGNFQGQSGLAVGLGYSYSDAMRFNAA
FTAAQQGAIGVRAGASWTLN
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SEQ ID NO: 17 *(Burkholderia fungorum)*

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MNKTYRSVWNESTGTWVAASEHASARGKKSSAKTSSTKAVVGALGLAAGLYGADAFALGGGLTLCPTTEGSAGYTAGSASSANGAYCG
SDYQWGLFSNTNADGSKSGQPIGAAIEGMNDGSLLLYGPNNIVMKNLVSMSSNKIINLAPGTVSSTSADAVNGSQLYATNQNVSNIGN
TVNNITTGAGIMYFHVNSTLADSTANGVNSIAIGGATRTDANNSISIGTGLTQASSNTGAIAIGQNASINVYGANSIAIGTNSATGGI
GGAIALGENAFATGGKMLALGSGASATTANSVALGSGSTTTANLTAAGYNPGSGTLAGTSQATNGEVSVGNAGAERRITNVAAGSAAT
DAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISSTVNNITNGGGIKYFHANSTQADSSATGTDAVAIGGNAQATAANSVALGLNSTSK
GTNAIALGGAVAGGSYAFAAGSLALAATTGDIALGSSATASSANSNAYATALGTNALANATDATAIGEGASATAASSVALGARSKTTA
NLSTAGYNPGTGTLSGTTPTGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLMSEDAKVNTINNNVNNLSNNVTNIAGNVTNISNTVN
NITNGGGIKYFHVNSTLADSSAGGTNSIAIGGGATTGNVTAGTSDNISIGTNATTNYGKNIAIGGNAQALGGAYDGGYNTAIGENAIA
KGDGAGGFGGGGWGQTTAIGGGSQALHDNTTAVGSGAIANVANATALGMSASATAGSAIALGQGAVASAANSVALGSGSTTTXNLSAA
GYNPGTGTLSGIASVANGEVSVGAAGKERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISNTVNNITNGGGIKY
FHTKSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGALSGIASAANGEVSVGAAGKERRITNVAAGSAAT
DAVNVSQLQSEDAKVNTISNNVNNLSGSVTNISSTVNNITNGGGIKYFHTNSTLADSTANGVNSIAIGGATRTDANNSISIGTGLTQA
SSNTGAIAIGQNASINVYGANSIAIGTNSATGGIGGAIALGENAFATGGKMLALGSGASATTANSVALGSGSTTTANLTAAGYNPGSG
TLAGTSQATNGEVSVGNAGAERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSNNVTNIAGNVTNISNTVNNITNGGGIKY
FHTKSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGTLSGTTPTGEVSVGSAGKERRVTNVAAGSAATDA
VNVSQLQSAIIGSTANAVAYDDGTKATVTLKGASGTKITNLTAGNLSATSTDAVNGSQLYATNQNVSNIGNTVNNITNGGGIKYFHAN
STQADSSATGSNSVAVGDRASSLGGSSVAMGDGATAVGAASIAIGNNAQNVTGSNNSVAIGGDSKAGDRSVSLGNGADTSLSSWGVAV
GTNANVSAALGTAIGAGANVSGANSTAIGANAVASATNSVALGSNSTTTANLSAAGYNPGTGTLSGIASAANGEVSVGAAGKERRVTN
VAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISSTVNNITNGSGIKYFHTNSTLADSSAGGANSIAIGGGAATSSSAGLS
DNMAIGTNATASYGKNIAIGGGAQATGGTYDGGYNVALGENANANATAGTNAWGHNTAIGANTVINGVNSVALGISATTSGSGSMAFGSA
AQASADYAIASGAGANASAVNSVALGSNSTTTANLSAAGYNPGTGTLSGIASVANGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLQ
SEDAKVNTINNNVNNLSNNVSNIAGNVTNISNTVNNITNGGGGIKYFHANSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTA
NLSAAGYNPGTGTLSGTTPVGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLQSAIIGSTANAVAYDDGTKATVTLKGASGTKITNLT
AGNLSATSTDAVNGSQLYATNQNVSNVGNTVSNLSNNVTNIAGNVTNISNTVNNITNGGGIKYFHANSTLADSSATGTDAVAIGGNAQ
ATAANSVALGSNSTTTANLSAAGYNPGTGALSATTPVGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLMSEDAKVNTINNNVNNLSN
NVSNIAGNVTNISNTVNNITNGGGSGIKYFHANSTLADSSATGVDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGALSGIA
SAANGEVSVGAAGKERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSNNVSNIAGNVTNISNTVNNITNGGGSGIKYFHANS
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SQLQSEDAKVNAEGAATAAALGGGSTYNTTTGAITSPTYIAGGKTFNNVGDVVTNIDGRVTQNSTDITNLTTTIDNGTIGLVQQATPT
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GGGIKYFHANSTLADSSATGVDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGTLSGIASAANGEVSVGAAGKERRVTNVA
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AIGGGSTVNTDGSISAPTYVVDGTTVHNAGDAISNLDNRVTQNTTDISTINNTLNSITTGAGVKYVHVNSTLADSLAKGAESVAIGGN
AQSQAANSVALGSNSVADRANTVSVGAAGAERQITNVAAGTADTDAVNVAQLKASGVINTDGTTNAAVTYDHNADGSANYNSVTMGNG
VAGGTTIHNVAAGSAADDAVNVSQMNAAISSVSNIIGSAGNPLFTADGNRDTEAAVASGTHATAMGANAKASAANSVALGANSVADRE
NTVSVGSAGNERQVTNVAAGTATTDAVNVGQLNQAIGASIGNLPAGMSAKDYTDQQINAVQNGVNQVAKNAYAGIAAATALTMIPDVD
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SEQ ID NO: 18 *(EPEC)*

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KYYHANSTAEDSLAVGEDSLAMGAKTIVNGNAGIGIGLNTLVLADAINGIAIGSNARANHADSIAMGNGSQTTRGAQTNYTAYNMDAP
QNSVGEFSVGSEDGQRQITNVAAGSADTDAVNVGQLKVTDAQVSQNTQSITNLNTQVTNLDTRVTNIENGIGDIVTTGSTKYFKTNTD
GVDANAQGKDSVAIGSGSIAAADNSVALGTGSVANEENTISVGSSTNQRRITNVAAGVNATDAVNVSQLKSSEAGGVRYDTKADGSID
YSNITLGGGNGGTTRISNVSAGVNNNDAVNYAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMAS
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SEQ ID NO: 19

GSGGGG

SEQ ID NO: 20 (Haemophilus aegyptius)

GTACCGCACGAGCTGGCAAAAAAGGCACGGCAGTCTCTTTTTGTCGAAGCCCATGATTACAAGTTGCTAGGTAAAATCAAACGTTATAC
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AAACAAAAGGCGCGCATTAAAGAAAAACGTGAAGATAAGAAAAAAACAGAGGCAAAGAAAAAAGTAAAATTGCGTCATAAGGATACAA
AAAATATCGGCAAACGACGCAAGCCAAGTAATAGTAATATTT**AA**<u>**TTAGGTATGATGTAAATTCTGCTT**</u>GAGGCAAATTTTACATAGGA
AATTTTTCTATATTGCTTTAACGTTTTTTTTATAGTAGAAGTATAT<u>**ACTCAG**</u>TTATGGTTATGGTTACATAG<u>**TATAGT**</u>TTTACTTTGTT
CTAGTTCACTTTAATAACCTTAAATAATTGAGGATTTCTT<u>AT</u>GAAAAGAAATTTATTAAAACAATCTGTAATCGCTGTGTTGATAGGT
GGCACTACTGTTTCTAATTATGCTTTAGCACAAGCACAAGCACAAGCACAAGTCAAAAAAGATGAACTTAGTGAGTTAAAGAAACAAG
TAAAGGAAATGGATGCTGCTATCGATGGTATTCTTGATGATAATATTGCTTATGAAGCTGAAGTTGATGCAAAACTTGATCAGCATTC
TGCTGCTCTTGGTAGACATACAAATAGACTCAATAATCTTAAAACGATTGCAGAGAAAGCAAAAGGTGATTCAAGTGAAGCACTTGAT
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TAGGTAC

SEQ ID NO: 21 (Haemophilus somnus)

ATGAAAAAAGTACAATTTTTTAAATATTCATCATTGGCATTAGCATTGGGTTTAGGGGTAAGTGCTTCTGCTTTGGCAGCCCCAACAA
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GGCTGGAATGAGGTAAAATCTCTCCCTCGTATCGATGGAAATGGAAAGGATAAACAGACAAAAGATCAAATAGCAATGTTGATAAGAA
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SEQ ID NO: 22 (Escherichia coli)

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ACGGGTTGCAGATAACAGCCAGCAAATTAACACGCTCAATAACCATTTCAGTTCGCTAAAAAACGAAGTTGATGACAATCGTAAAGAA
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SEQ ID NO: 23 (Escherichia coli)

ATCGCCAAACAGCGTCGGCGTCTGGGCGCAGTAAGAGACTTGCTGACGGTAGATTTCTGGCTTTAGTGTGCTGACATCCTCACCTTCA
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TTTTGGTCGCTATACCAAAACGTTACAGCCGGGGCTCAGTCTGGTGGTGCCGTTTATGGATCGCATTGGTCGCAAGATCAATATGATG
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SEQ ID NO: 24 (EPEC)

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CAGCCCCGCTGCATATACCTATTTGACTGAACATCACTACATCCCTTCTGAAACACCTGATACCACTCAGACTCCCCCTGTCCAGACA
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TACGCAAAATACCGCGCATTATCAGGAGATGATTAATGCCAGGCTGGCGGCTCAAAATGAGGCTAATCAGCGCACTACCACGGAACAA
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SEQ ID NO: 25 (EAEC)

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SEQ ID NO: 26 (UPEC)

ATGAACAAAATATTTAAAGTTATCTGGAATCCGGCAACAGGCAGTTACACCGTTGCCAGCGAAACGGCGAAGAGCCGTGGTAAAAAAA
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-8-

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SEQ ID NO: 28 (EAEC)

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SEQ ID NO: 29 (Burkholderia fungorum)

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SEQ ID NO: 30 (EPEC)

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SEQ ID NO: 31 (Shigella)

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SEQ ID NO: 32 (Brucella melitensis)

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SEQ ID NO: 33 (Brucella suis)

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SEQ ID NO: 34 (Ralstonia solanacearum)

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ACGACGGCCGAGGGCAATCTGTCGTCGAACACGACGAGCATCACGAACCTGCAGAACACCATCAAGAACATCAGCGGCGGCTCGGCGG
GTCTGGTGCAGCAATCGGCTGCGGGCAAGGACATCACCGTGGCCAAGGACCTGGACGGTGACGCGGTGGACTTCAGCGGCAAGAAGCT
GAGCGACAGCACGACGTTCTCGCGCAAGCTGACGGGTGTTGCGGAGGGGACGTTGTCGGCGACGAGTACCGATGCGGTGAGCGGCAGG
CAGCTCTATACGACCAACCAGAACCTGAGCACGACGAACCAGAATCTGGCGGACACGAACAAGAGCCTGGCCGAGACGAACAAGAACG
TGTCGGCGACCACGACCAACATCACGAACCTGCAGAACACGGTGAACAACATCAGCAGCGGTTCGGCGGGTCTGGTGCAGCAATCGGC
AGCGGGCAAGGACATCACAGTGGCCAAGGACCTGGACGGTGACGCGGTGGACTTCAGCGGCAAGAAGCTGAGTGACAGCACGACGTTC
TCGCGCAAGCTGACGGGTGTGGCGGAGGGGACGCTGTCGGCGACGAGCACGGATGCGGTGAGCGGCAAGCAGCTCTATACGACCAACC
AGAACCTGAGCACGACCAACCAGAATCTGGCGGACACGAACAAGAGCCTGGCCGAGACGAACAAGAACGTGTCGGCGACCACGACCAA

CATCACGAACCTGCAGAACACGGTGAACAACATCAGCAGCGGTTCGGCGGGTCTGGTGCAGCAGTCGGCCGCGGGCAAGGACATCACG
GTGGCCAAGAACCTGGACGGTGACGCGGTGGACTTCAGCGGCAAGAAGCTGAGTGACAGCACGACGTTTTCGCGCAAGCTGACGGGTG
TGGCGGAGGGGACGCTGTCGGCGACGAGCACGGATGCGGTGAGCGGCAAGCAGCTCTATACGACCAACCAGAATCTGGCGAGTACCAA
CAAGGACCTGGCCAATACCAACACGCGCCTGACGACGGCCGAGGGCAATCTGTCGTCGAACACGACGAGCATCACGAACCTGCAGAAC
ACCATCAAGAACATCAGCGGCGGCTCGGCGGGTCTGGTGCAGCAATCGGCTGCGGGCAAGGACATCACCGTGGCCAAGGACCTGGACG
GTGACGCGGTGGACTTCAGCGGCAAGAACCTGAGCGACAGCACGACGTTCTCGCGCAAGCTGACGGGTGTTGCGGAGGGGACGTTGTC
GGCGACGAGTACCGATGCGGTGAGCGGCAAGCAGCTCTATACGACCAACCAGAACCTGAGCACGACGAACCAGAATCTGGCGGACACG
AACAAGAGCCTGGCCAAGACGAACAACAACGTGTCGGCGACCACGACCAACATCACGAACCTGCAGAACACGGTGAACAACATCAGCA
GCGGTTCGGCGGGTCTGGTGCAGCAGTCGGCAGCGGGCAAGGACATTACGGTGGCCAAGGACCTGGACGGTGACGCGGTGGACTTCAG
CGGCAAGAAGCTGAGCGACAGCACGACGTTCTCGCGCAAGCTGACGGGTGTGGCGGAGGGGACGCTGTCGGCGACGAGCACGGATGCG
GTGAGCGGCAAGCAGCTCTATGCGACGAACCAGAATGTGTCGAAGTTGTCGGCGAACGTCACGGACGTGAGTGATAGCGTCACCAACA
TCAAGAACACGATGAACACCATCGTGAACGGCGGCGGGCTCAAGTACTTCCACGCGAACTCGACGCTGGACGATGCGCAGGCGATGGG
CCTCGAGTCGATCGCGTTCGGCGGCGCAGCCGTCGCGGCCGGTATGAACTCGATGGCGATGGGCGGCAATGCCCGGGCGGTGGCGGGC
AACGCTGTGGCCTTGGGCGCGGGTTCGGTGGCGGACCGCGCGAACACGGTGTCGGTGGGCTCGGCGGGCAAGGAGCGCCAGATCACCA
ACGTGGCGGCCGGTACGGCGGACACGGATGCCGTGAACGTTGCCCAGCTGAAGGCGGCCGGCATCATCAACGGCAGCGGCAGGACCAA
CGCCACGGTGACGTACGGCACCAACGCAGACGGCTCGGCGGACTACGGCAACGTGACGCTGGGCGGCGGCAACGCGCCGGCCGGCACG
GCGATCCACAACGTCGCGGCCGGCACGGCCGAGACCGACGCGGTGAACGTCAGGCAGATGAACGCGGCCATTGCCAGCGTGCAGAAGG
TGAGCAACACCAACGACCCGATGTTCGCGGCGGATGGCGACCGCGCTGTCAAGCGCGCGAGCGCCAAGGGCACGCATGCCACGGCGAT
GGGTGCCGCGGCCAGCGCGGGCGGCGACCAGTCGGTCGCGACGGGCCACAACGCGCAGTCGGGCGGCGACAGCTCGGTCGCGATGGGC
GCGAATGCGAAGGCGACGGCGAATCATGCGGTTGCCGTGGGCTCGGGTTCGGTAGCGAACCGCGCGAACACGATGTCGGTGGGCTCGG
CGGGCAGCGAGCGCCAGATCACCAATGTTGCGGCCGGTGTGCAGGGTACCGATGCGGTCAACGTGAGCCAGCTGAGCCAGGCGGTCTA
TGCGGCCGTCGGCGATCTGCCGGCGGGCACGACGGCCAGGCAGTACACGGATGAGCAGATCGGCATGGTGCGGCAGGGGATCAGCCAG
GTGGCGCGCGGCGCTTACAGCGGTATCGCGGCGGCGACCGCGCTGACGATGATTCCGGACGTCGATCAGGGCAAGTCGATCGCGATCG
GTATCGGCAGCGCGACCTACAAGGGCTATCAGGCGGTTGCGCTGGGCGCCTCGGCACGCATCTCGCACAACCTGAAGGCCAAGATGGG
CGTGGGCTACAGCAGCGAAGGCACGACGGGTCGGCATGGGCGCGTCGTATCAGTGGTAA

SEQ ID NO: 35 (Sinorhizobium meliloti)

GTGGCGCTGGGACGCCAATCGGTCTCGGCCGGCAGCGGTTCACTTGCATTCGGTAACGGTAGTTACGCGAATTCAAACGGATCGGTTG
CCATCGGGCAGTCTGCATACGCGGCCAATGTTCGGGCAATCGCAATCGGTGGAGATGATGCCTTCGCTTGGCGAGAGGCCGAGCAGAC
CAAGGCCGGGGGCTCCCAGTCGATCGCCATGGGCGTGCGTGCGCGTACGAAATCGCTGGTAGTCGACGACCCGGATACGGTGGCCAAC
GAAGCGGACCCGGGCGGCGCGTCTGATGCCATTGCAATCGGTACGGATGCACAGGCCAATGGCGACCGGTCTCTCGCCATCGGCAGAC
AGAATCAGGCCGGCAATGAGCAATCCATCGGCATCGGCGCGGGCAACACGGCAACAGGCAAACTCTCGATCGGCATCGGCAGCAGCAA
CGTGGCCAGCGGCGAGCAATCCCTAAGCCTCGGCGCCGGCAACAATGCCCTGGGGCAGGGCTCCATCAGCATCGGTACCGAAACCACA
GCCGGCCGGTCTCCGGTCGATCGCTTTCGGCGTGCGCGCGAGTACGAAAGAAGCCAATCTAGATATTCCGGATGACGTGGCCGCGATCG
ACGCCATCGCTATCGGTACCAATACCAAGGCCAACGGCGACCGGTCCGTCAGCATCGGAACGGGCAGTCAAGCCAGCAGCGGAGCCGT
CAGTATTGGCGATGCAGCCAAGGCTGTGGGTGACAAATCCGTCAGTATCGGTACCGAAAGCTGGGCCGATGGCGACGAATCGGTCAGC
ATCGGCCTCGTCAACAACGCCGGGTTTGAAGGGAATGACCGAATCAAAGGCGGGCAAACCTCTGTCAGCCTGGGAGCCTTCAATCAGT
CGCCGGGCATCGAGGCCATTGCTATCGGTGCCAGAAACGAAGCCAATGCGGATCGGTCGATTGCAATCGGCTCGCGTGCGAAAACGAA
GGCCGCCGATCCGGCGCAGGCGGACGGCGGTGCGCGCGACGCCGTCGCTATAGGCACGGATGCGCTGGCCAACGACGACCGGTCCATC
AGCATAGGCTGGAATAGCAGTACCTCCCTGAACGATTCCATCAGCATCGGTACCCGAGCCACGTCGGGATCGGCGGGCGATATCATGA
TCGGCACAGGTTCAGGGACTGGTTCCACCTCCGGTCAGAACAATGTCGCCCTCGGCGTTGCGGCCAGTCAGAAGGTGAAGGGGGTCGTC
AAACATAGCGATCGGCGATTCGGCGGGCGGTTCCCGGGAAGGCGATAACAACGTCGCCATAGGCACCAATGCGGGAATCCAGTTTTCC
GAGAGCGAACATGAGACCGCCGTGCGCGCCGACCTCGTGGTCAGTGACGCGGTGAGCATCGGCAATGAGGCGCTGGCGAGCGCCGATG
AAGCCATCGCAATCGGCACCGGCGCCGTGGCTTCCGGTTTGAAGTCCATCAGCATCGGCGTCGGAAATACCGTCAGCGGCGCTTCGAG
CGGCGCCATCGGCGATCCGACCGATATCACCGGTACCGGCTCCTACTCGCTGGGCAACGACAACACCATCGCCGCCGACAACGCCGGC
ACCTTCGGCAACGACAACACATTGGCGGATGCCGCCGATGGCAGCCGCGTCATCGGCAACGGCAACAATATCGATGTGTCCGATGCCT
TCGTGCTCGGCAATGGTGCCGACGTCACCGAAGTCGGCGGCGTGGCGCTGGGTTCCGGCTCGGTTTCGGATACGGGTGCCGACGTGGC
GGGCTATGTGCCGGGCGGGGCCTCGACGGCCGACCAAAACGCCATCGAGGCGACGCAGAGCACGCGCGGCGCGGTCGCCGTCGGCAAT
CCGGACGCCGAAACCGGCGTCTACCGCCAGATCACAGGTGTCGCCGCCGGCACGGCCGACTCCGATGCCGCCAACGTGGCCCAGCTCA
AATCGGTCGAGACGATCGCCAAGACAGGCTGGAAGCTCACGACGGACAGCGGCAGCATCGACGGCATCGGGCCGGGCGACGAGTTGGT
CCTCAAAGGCGGCGACGGCAATATCGTGATCAGCAATCAGATCTTGAGCAACGACGTGAGCATCGATCTGGCCGATGAGATCGAGGTG
AACAGGGTGACGGCGAGAGATCCCGACACGGGTGCATCCACGGTGCTGGACGAGAACGGCCTGAGCTTCACGACGCAGGACGCGAACG
GGGAGGACACGGCGCTCGGCCCGCGCGTGACGGCGGCGGGCATCCAAGCGGCCGGCAAAATCACCAATGTCGCTGCGGGCGAGGCCGA
CACCGACGCGGTGAACTTTTCCCAGCTCAGGCAAGTCGAGACCGCATCGGGCAATACCGACCAGCGGGCGGTCAAATATGACTGGACC
GACGCCAATACGAATGGCGTGATCGATGAGGGCGAACTCAACCTCGATAGCGTGACCCTTGCCGGGGGCATGGGCGGCACCAGGATCT
CCAATCTTGCGCCCGGCGCCTTGAGCGCGGCATCGACCGATGCCGTCAACGGCAGCCAGCTCTTCGGGCTTCGCAGCCGCGTATCCAA
CGTGGCCGTCGCCCTGGGCGGGGGAGCCGCCTATGACCCTGTCAAGGATGAGTGGATCGCCCCGAAATACACGATCGGCGGCACCGAC

TACAGCAATGTCGGCGACGCGCTGGCGGCGGTGGGCGGCACGGCCGGTGCCGGCTGGAGCCTCTCGGCGCAGGGTGCGAACGCGTCCA
ATGTCGCGCCGGGCGAGACGGTGGATCTTCGCAGCGGCGACGGCAATATCGTCGTCAGCAAGGCGGAGACCGGCGACACCGTGAGCTT
CGACCTGGCCGACGATCTGGACGTCTCCGAAAGCATCACGGTGGGTGCCGATCCCGCCGATCCGAATGCGCCGACCACTGTTATCACC
GGCGGTTCGATCGTGATCGGCAGCACCATGCTCGGCAGCAACGGCCTGGTCATCACCGGGGGGCCGAGCGTCACGACCGATGGCATCG
ATGCCGGCGGCATGAAGGTCACGAATGTGGCAAACGGTACGGTGGCGAAGGATTCGAAGGATGCCGTCAACGGCGGCCAGCTCTTCGA
CGTCGTTGCGAATGCCACTGCGAATGGCGTCGGCTATGACGACAAAAGCAAGGGCACCCTGACGCTGGAGGGGGCTAACGGCACCAAG
ATCACCAATGTCGCCGCGGGCGACCTGAACGCGAACTCGACCGACGCGGTCAACGGCAGCCAGCTTTACGCCACGAACGTGAAGGTCG
ATCGGCTCGATACCGAAGTGAAAGAGATCGACAGCCGCGTAACCTATATCGAGAGCTTCCAGGGCGATCTGGAGAACGCTGCCGTCTA
TGATACCGACGCTGCCGGCAAGAGGCTCAACACGCTGACGCTCGAGGGAGGAGATCCCGACAAGCCGGTGCTCATCGCCAATGTGGCC
AAGGGCGTGAAGGCGACCGACGCCGTCAATGTCGGCCAGCTCGACGAAAGCGTCGCGGAAAGCAAGAGCTACACGGACGAAAAGACCG
AGTGGGCGATCGATCAGGCGGCCATCTACACCGACCAGGTTATCGAGACCAAGGTGAGCGCGGTGAACAATTATGCGCAACAACGGTT
CGCGCAGCTCTCGGGCGAGATCGGGCAGGTTCGGAGCGAAGCGCGGCAAGCCGCCGCCATCGGACTTGCGGCGGCCTCGCTGCGCTTC
GACAATGAGCCGGGCAAGCTGAGCGTGGCGCTCGGCGGCGGCTTCTGGAGAAGCGAAGGGGCGCTCGCCTTCGGTGCCGGCTACACCA
GCGAAGACGGACGCGTCCGGGCGAACCTGACCGGTGCTGCGGCCGGGGGGAACGTCGGTGTCGGTGCCGGCCTCAGCATCACGCTCAA
CTGA

SEQ ID NO: 36 (Bradorhizobium japonicum)

GTGCGGGCCTTCGGCTCCGGCAACGCCATCAACGGCACCAACTACGCGGCCGTCGGCTCCAACAACGTCGTCGCCGGCAACAACGGCG
CGGTTGTCGGCTCCGGCAACGGCGTCACCGGCGACAACACCGCGGCCTTCGGCTCCAGTATCGGCATCGCCGGCGGCAACAACGCGGC
TGTCGGCTCCTTCAGCACCGTCACCGGCAGCAACAGCGCGGCTGTTGGCTCCTTCAACAACGTCAGCGGCAATAACAGCGGCGCCTTT
GGCACCGGACAGAACATCCGCGGTAACGGCACGTTCGCCATCGGCGATCCCAACATCGTCAACGGCAACAACAGTTTGGTGTTCGGCG
ACAACAACACGGTGAACGGGTCCAATGTGGCGGGTCGCGGCGACAACATCCAGCTGGTCGGCTCGAACAACACCATTGCGGCAACGTC
CAGCGCCGCCGGCTCATCCGTGTTCGGCAGCGGCAACACCGTCAACGCCACCAATGCCGTGGTGATGGGCAACAACAGCACCGTCTCC
GGCGCGTCCTCTGTCGCGATCGGCAATGGCACGGCCGTTACCGGCATCAACGCGATCGCGATGGGCACCGGCGCCGGCGCGAATTTCG
ACAACTCGGTCGCGATCGGCAGCGGCGCGACCACGACGCGCGCCAACCAGGTCGCAGTCGGCACCGCCAGCAGCACCTACACGATGAG
CGGCATCACCTCGGCTGCGAGCAAGGCGGCGCAGTCCGGACCGACCCAGCTCGTCACATCGGACGCGGCCGGCAATCTGGCGACCACC
TCGCTGGCTGGCCTCGGACTTGCCTCCGCCGGCGACATCAACGGAATCAACTCCCAACTGGCCGCCCTCAACGGCCGCGTCGACAACC
TGACACGGGAGTCGCGCGGCGGCGTGGCGTTGGCGCTCGCGGCGTCCAGCCTGCAATTCGATCCTCGCCCCGGCAAGATCTCGGTCTC
CGGCGGCTTCGGCAATTTCCAGGGACAATCCGGCCTCGCGGTCGGCCTCGGCTATTCCTATTCGGACGCCATGCGCTTCAACGCGGCG
TTCACGGCCGCACAGCAAGGCGCCATCGGCGTCAGGGCCGGCGCGTCGTGGACGCTGAACTGA

SEQ ID NO: 37 (NadA)

MSMKHFPSKVLTTAILATFCSGALAATSDDDVKKAATVAIVAAYNNGQEINGFKAGETIYDIGEDGTITQKDATAADVEADDFKGLGL
KKVVTNLTKTVNENKQNVDAKVKAAESEIEKLTTKLADTDAALADTDAALDETTNALNKLGENITTFAEETKTNIVKIDEKLEAVADT
VDKHAEAFNDIADSLDETNTKADEAVKTANEAKQTAEETKQNVDAKVKAAETAAGKAEAAAGTANTAADKAEAVAAKVTDIKADIATN
KADIAKNSARIDSLDKNVANLRKETRQGLAEQAALSGLFQPYNVGRFNVTAAVGGYKSESAVAIGTGFRFTENFAAKAGVAVGTSSGS
SAAYHVGVNYEW

SEQ ID NO: 38 (YadA)

MTKDFKISVSAALISALFSSPYAFADDYDGIPNLTAVQISPNADPALGLEYPVRPPVPGAGGLNASAKGIHSIAIGATAEAAKGAAVA
VGAGSIATGVNSVAIGPLSKALGDSAVTYGAASTAQKDGVAIGARASTSDTGVAVGFNSKADAKNSVAIGHSSHVAANHGYSIAIGDR
SKTDRENSVSIGHESLNRQLTHLAAGTKDTDAVNVAQLKKEIEKTQENTNKRSAELLANANAYADNKSSSVLGIANNYTDSKSAETLE
NARKEAFAQSKDVLNMAKAHSNSVARTTLETAEEHANSVARTTLETAEEHANKKSAEALASANVYADSKSSHTLKTANSYTDVTVSNS
TKKAIRESNQYTDHKFRQLDNRLDKLDTRVDKGLASSAALNSLFQPYGVGKVNFTAGVGGYRSSQALAIGSSYRVNENVALKAGVAYA
GSSDVMYNASFNIEW

SEQ ID NO: 39 (Consensus)

MXXMKXXKXXLLAXAIXAXFSXGALAAXTXDXXXTGPEAXXVXIXPXAXXXLXXXXXXXXXXXXXXXXGLXAXAXXXXSSXADAEAXVFK
GLXXXXXXPNIXTXXXXXQTKDQIAMLIRXXXNLXENKXXVXXXVAAIKXIPKDLIAKXADVDXXXXXVXXAXXRXTXAXNNLKSGHS
SHVAANHGYSIAIGDRSKTDRENSVSIGHESLNRXLXXXAXKXKEEXXENIAQIDXNXEQXXEXXDKXXEXXNXXXXXLAXXXXXAXX
XAXXVNLXXXXXXXXXXXXXXTTXNXLXQKIAEXKXNXDAXKXKAXXXXXXXXXXXXXXXXXXAXNTKDIXXLXTXXXDXXXNSAXXAA
XTXXIATEXSXXFEXXXXKXXQXXQXIANNXTXVAIXEQXIXXNTARIDXLDNRVNXLDKEXKAGLASQAALSGLFQPYNVGKLNVSA
AVGGYXSXXAXAIGXGSXRFNENXAAKAGVAXDTQXGGSSAGYXVGVNFEW

5 ## SEQ ID NO: 40 (primer)

TATCGGCAAACGACGCAAGC

SEQ ID NO: 41 (primer)

GGGCGATTAGCCATTGATAC

SEQ ID NO: 42 (primer)

AACGGTTGATGCCGCACTAG

SEQ ID NO: 43 (primer)

GTGTTGATAGGTGGCACTACTG

SEQ ID NO: 44 (primer)

GCAGAGAAAGCAAAAGGTGATTC

SEQ ID NO: 45 (primer)

CAAAATTCTGCAGACATCGCAAC

5 *SEQ ID NO: 46 (primer)*

CAAACTGCAGTTGCTGTAGG

SEQ ID NO: 47 (primer)

ACCTACAGCAACTGCAGTTTG

SEQ ID NO: 48 (primer)

CAACTCCCTCTTCTAAAGCTG

SEQ ID NO: 49 (primer)

AGTAGTGCCACCTATCAACAC

SEQ ID NO: 50 (HadA)

CGACGCAAGCCAAGTAATAGTAATATTTAATTAGGTATGATGTAAATTCTGCTTGAGGCAAATTTTACATAGGAAATTTTTCTATATT
GCTTTAACGTTTTTTTATAGTAGAAGTATATACTCAGTTATGGTTATGGTTACATAGTATAGTTTTACTTTGTTCTAGTTCACTTTAA
TAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTATTAAAACAATCTGTAATCGCTGTGTTGATAGGTGGCACTACTGTTTC
TAATTATGCTTTAGCACAAGCACAAGCACAAGCACAAGTCAAAAAAGATGAACTTAGTGAGTTAAAGAAACAAGTAAAGGAAATGGAT
GCTGCTATCGATGGTATTCTTGATGATAATATTGCTTATGAAGCTGAAGTTGATGCAAAACTTGATCAGCATTCTGCTGCTCTTGGTA
GACATACAAATAGACTCAATAATCTTAAAACGATTGCAGAGAAAGCAAAAGGTGATTCAAGTGAAGCACTTGATAAAATTGAAGCTCT
TGAAGAACAAAATGATGAGTTTTTAGCGGATATTACAGCTTTAGAAGAGGGAGTTGATGGTTTAGATGATGATATCACAGGTATTCAA
GATAATATTTCTGATATAGAAGATGATATTAATCAAAATTCTGCAGACATTGCAACTAACACAGCGGCAATCGCAACTCACACTCAAC
GTCTTGATAATTTAGATAACAGAGTAAATAACCTTAATAAAGATCTTAAACGTGGTCTTGCTGCTCAAGCTGCATTAAATGGTTTATT
CCAACCGTATAACGTAGGTAAATTAAATCTTACTGCTGCTGTAGGTGGTTATAAATCTCAAACTGCAGTTGCTGTAGGTACTGGTTAT
CGTTATAACGAAAATATCGCGGCTAAAGCAGGTGTTGCTTTCACTCATGGTGGCAGCGCAACTTATAATGTTGGCGTAAATTTTGAAT
GGTAATTAGATAACTAATTTTCCATAACAGAAAATAAATACCTGTTTTTGAGTAATATCAGAAACAGGTATTTTTTTATAGGCTTCGT
TTCGCACACTCGTTACTAGTGTGGATATGTGAATAAAATCAATAATATTTGGAGTATTTCATCTATTTTATTAATTTTGTTAGCGGAT
AAAATAACTTTCTGTGTGTTCCTCCAAATTCTTTAAATTCAATAAACCCTAATCGTTCATAAAACGAGCTGGCATCATCATTTTTTGC
TTCAACGACTAAAATTGTAGCAGCTACCGTAGCATTCTTAATCTTATGAATGGCGTCTGCAATTAGAAACTTTCCATACCCTTGCTTC
TGGAAATTCGTATCAATGG

10 *SEQ ID NO: 51 (HadA)*

MKRNLLKQSVIAVLIGGTTVSNYALAQAQAQAQVKKDELSELKKQVKEMDAAIDGILDDNIAYEAEVDAKLDQHSAALGRHTNRLNNL
KTIAEKAKGDSSEALDKIEALEEQNDEFLADITALEEGVDGLDDDITGIQDNISDIEDDINQNSADIATNTAAIATHTQRLDNLDNRV
NNLNKDLKRGLAAQAALNGLFQPYNVGKLNLTAAVGGYKSQTAVAVGTGYRYNENIAAKAGVAFTHGGSATYNVGVNFEW

SEQ ID NO: 52 (HadA C-terminus)

TGYRYNENIAAKAGVAFTHGGSATYNVGVNFEW

SEQ ID NO: 53 (Gene downstream of HadA)

ATGATAAATGAAAATTTAGCATATTTAAGTGTATTACCCTTAGAAGATGTAAAGATTGAGAGAAGTTCATTTTCTTGTTCAGTTGAAC
CTTTAGAAAACTACTTTCATAAGTACGTTTCTCAAGATGTAAAGAAAGGGCTTGCAAAGTGTTTTGTGCTTATAAATGCACAACCATC
TAGGATTGTTGGCTATTACACTTTATCGGCATTATCAATACCAATTCCAGATATACCCCAAGAACGAATAAGTAAAGGCGTACCATAT
CCTAATATTCCTGCTGTTTTAATAGGGCGATTAGCCATTGATACGAATTTCCAGAAGCAAGGGTATGGAAAGTTTCTAATTGCAGACG
CCATTCATAAGATTAAGAATGCTACGGTAGCTGCTACAATTTTAGTCGTTGAAGCAAAAAATGATGATGCCAGCTCGTTTTATGAACG
ATTAGGGTTTATTGAATTTAAAGAATTTGGAGGAACACACAGAAAGTTATTTTATCCGCTAACAAAATTAATAAAATAG

SEQ ID NO: 54 (Sequence encoded by SEQ ID NO: 53)

MINENLAYLSVLPLEDVKIERSSFSCSVEPLENYFHKYVSQDVKKGLAKCFVLINAQPSRIVGYYTLSALSIPIPDIPQERISKGVPY
PNIPAVLIGRLAIDTNFQKQGYGKFLIADAIHKIKNATVAATILVVEAKNDDASSFYERLGFIEFKEFGGTHRKLFYPLTKLIK

SEQ ID NO: 55 (Histone acetyltransferase)

MINENLAYLSVLPLEDVKIERSSFSCSVEPLENYFHKYVSQDVKKGLAKCFVLINAQPSRIVGYYTLSALSIPIPDIPQERISKGVPY
PNIPAVLIGRLAIDTNFQKQGYGKFLIADAIHKIKNATVAATILVVEAKNDDASSFYERLGFIEFKEFGGTHRKLFYPLT

SEQ ID NO: 56

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCACCTAGTG

SEQ ID NO: 57

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCACCTAGTG

SEQ ID NO: 58

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 59

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGCGGGTTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 60

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGCGGGTTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 61

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGAAATGAGGATTTCTTGTATTGGTAT
TAACTAAATTACGCATTAATAAGGCGTAATTTAAGTTAATATCTTGTGGCACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 62

TTAGGTATGATTTAAATTCTG

SEQ ID NO: 63

ATAGTATAGTTTTACTTTGTTCTAGTTCACTTTAATAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTAT

SEQ ID NO: 64

CCGACGCAAGCCAAGTAATAGTAATATTTAATTAGGTATGATGTAAATTCTGCTTGAGGCAAATTTTACATAGGAAATTTTTCTATAT
TGCTTTAACGTTTTTTTATAGTAGAAGTATATACTCAGTTATGGTTATGGTTACATAGTATAGTTTTACTTTGTTCTAGTTCACTTTA
ATAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTATTAAAACAATCTGTAATCGCTGTGTTGATAGGTGGCACTACTGTTT
CTAATTATGCTTTAGCACAAGCACAAGCACAAGCAC

SEQ ID NO: 65

AGGATACGAAAAATATCGGCAAACGACGCAAGCCAAGTAACAGTAATGTTTAGGCTTGTATAGTATAGCTTTGCTTTGTTCTAGTTCA
ATTTAATAATCTTAAATAATTAAGGATTTCTTATGAAAAAAAATTTATAGGCTTCGTTTCGCACACTCGTTGCTAGTATAGATATGTG
AATA